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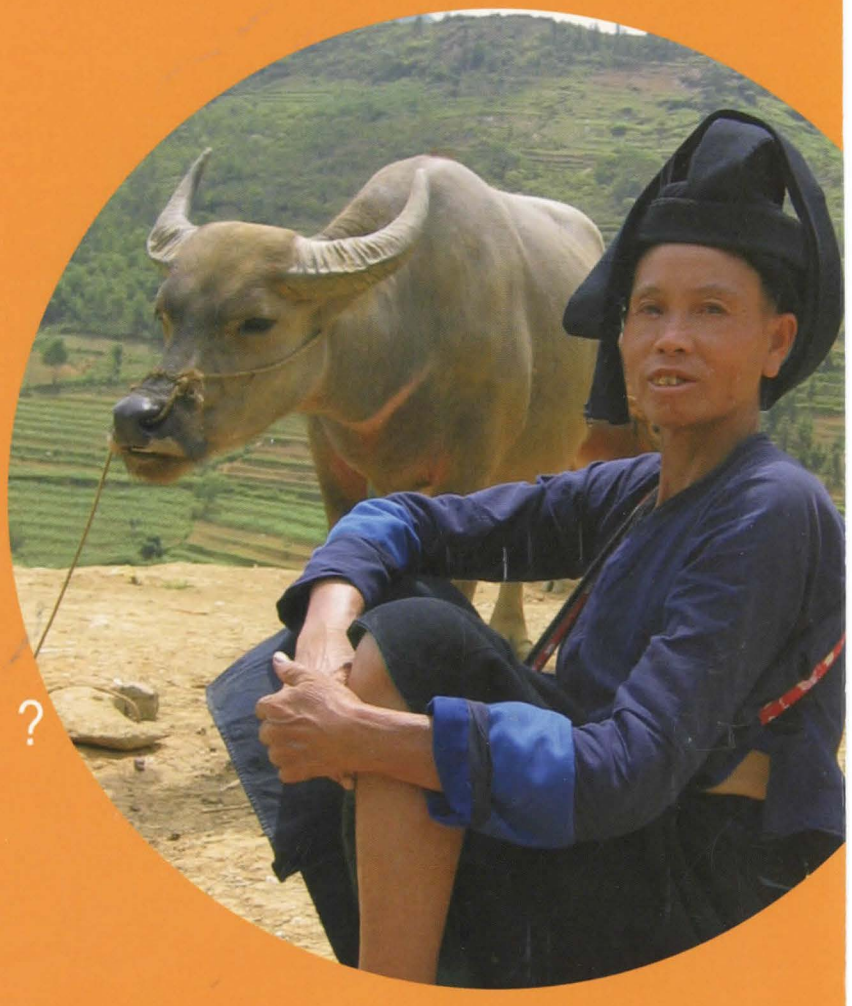

Does control of animal infectious risks offer a new international perspective ?

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INTRODUCTION AND DISSEMINATION OF NEWCASTLE DISEASE VIRUS IN NORTH CAMEROON: MODELS AND QUALITATIVE RISK ANALYSIS

NZIETCHUENG S.[1], AWA D.N.[2], VIAL L.[1]*, POUILLOT. R.[3], GOUTARD F.[1], ROGER F.[1]

1.Cirad, Epidemiology and Ecology of Animal Diseases Research Unit Campus international de Baillarguet, 34398 Montpellier Cedex 5, France
2.Institut de Recherche Agricole pour le Développement, IRAD, BP 1073, Garoua, Cameroun
3.Centre pasteur du Cameroun, BP 1274, Yaoundé, Cameroun

ABSTRACT

In North-Cameroon, Newcastle disease (ND) is responsible for 90% of mortalities in backyard poultry. In spite of the economic importance of this disease, there is no strategy of vaccination. The tools of participatory epidemiology allowed us to better understand the possibilities of introduction and spread of the virus in a village and thus to better target surveillance and control. A qualitative risk analysis of introduction of the NDV made it possible to treat on a hierarchical basis the various possibilities of introduction of the NDV and to target the priority zones for vaccination. The participatory epidemiology approach gave room for the participation of poultry farmers in the process of sensitisation and communication on behavioural risk and also in the development of a strategy of vaccination.

INTRODUCTION

In North-Cameroon, poultry production is essentially in the backyard system. On average, each rural household owns about 10 chickens. For these families, poultry play an essential economic role. In general, few health services exist for this type of poultry-keeping and Newcastle disease (ND) is one of the principal health constraints. ND is enzootic with a prevalence of 46% (Agbédé *et al.*, 1992) and a mortality rate which can reach 90% (Awa *et al.*, 1997; Awa *et al.,* 2007). The enzootic character of the disease and the high mortality rate have a significant impact on the incomes of families. The implementation of a vaccination strategy aiming at reducing the clinical

*Contact author : Email : laurence.vial@cirad.fr

expression of the disease is essential in order to reduce the impact of ND on family incomes. The tools of participatory epidemiology associated with a risk analysis enabled us to identify the elements to be taken into account in the development of a vaccination strategy.

MATERIALS AND METHOD

The following participative epidemiology tools (Catley, 1997; Mariner *et al.*,. 2000) were used: a semi structured interview (characterization of production systems, description of the epidemiological situation), calendars (identification of the period of appearance of the disease), arrow diagrams (identification of poultry movements and risk behaviours) and Venn diagrams (identification of the various possibilities of introduction of the NDV). These tools generated qualitative data which were used for the qualitative risk analysis.

The process of risk analysis (Dufour *et al.*, 2002) was as follows: (i) identification of the danger; (ii) evaluation of the risk and (iii) communication about the risk. For each event we used the qualitative appreciations (Zepeda, 1998) and a decision tree in order to determine the various qualitative probabilities of introduction of ND in the village. The objective of this step was to hierarchically classify the various possibilities of introduction of the NDV.

RESULTS

The epidemic period of ND extended from December to April with peaks in December and January. The conceptual models of introduction and spread of the NDV highlight two possible ways of introduction into a village: *via* the markets and/or the gift of poultry. The qualitative estimate of risk shows that the probability of introduction of the NDV into a village is high through the market route and moderate through the gifts respectively. The spread of the NDV on the provincial scale is primarily through trade.

The goal of the strategy of vaccination is to reduce the clinical expression of the disease. According to our study, this goal can be achieved through a three-phase approach as follows.

- Education/training and vaccination campaigns: A public awareness campaign and training on behavioural risk carried out in October,

followed in November by a collective vaccination in the village would reduce the risks of dissemination of the NDV.

- Management and monitoring of the villages: Installation of good management indicators and follow-up of vaccination
- Evaluation of vaccination: Evaluation of vaccination follow-up and epidemiological indicators

The management and monitoring of the villages will have to be done for 24 months for a meaningful evaluation of vaccination.

DISCUSSION

The enzootic character of ND in the province of North-Cameroon and neighbouring regions as well as the resurgence of ND at the same period each year (Maho *et al.,* 2004) justifies the development of the strategy of vaccination to reduce the clinical expression of the disease. By identifying the elements to be taken into account in the development of this strategy using the tools of participatory epidemiology, it was possible to cheaply and quickly identify and treat on a hierarchical basis the principal ways of introduction of ND and to communicate on this risk. This step confirms the usefulness of this method in zones with low potential of analysis.

On 11 March 2006, a case of avian influenza was identified in the Far North province of Cameroon, neighbouring the North Province. In the Far North, ND represents one of the major health constraints of poultry. Because of the epidemiological similarity of these two diseases the approach outlined here would also be applicable to avian influenza.

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